DETERMINANTS OF THAI FOOD INDUSTRY INNOVATION: A CONCEPTUAL PERSPECTIVE

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Abstract- The proposed study is concerned with the development of a structural equation model of how intellectual capital and knowledge management affect innovation within Thailand's food industry. Due to rising urbanization and an expanding middle class, Thailand will rely more on processed foods. This is combined with a 22% export market to other Southeast Asian nations, as well as China and Japan. With an abundance of natural resources combined with significant investments in technology, food safety, R&D, and more efforts at adhering to international quality standards, Thailand has become the 'Kitchen of the World', becoming the largest sole net food exporter in Asia. Therefore, the researchers aspire to develop a structural equation model of factors affecting intellectual capital and knowledge management on the Thai food industry innovation using both quantitative and qualitative research methods. Questionnaires using a 7-point Likert scale will be analyzed using SEM techniques with focus being given to product innovation, process innovation, and technical innovation in enhancing the industry's global competitiveness and sustainability.

Keywords- food industry, intellectual capital, knowledge management, innovation

I. INTRODUCTION

Thailand has earned the designation of "Kitchen of the World" [1] with the food and agricultural industry in Thailand growing rapidly over the years owing to an increasing demand in consumer markets, both domestically and internationally. According to the United Nations (UN), the world's population will need twice as much food and 30% more drinking water by 2050 [2]. Simultaneously, the world's agricultural production is projected to fall by 10-15% from the consequences of climate changes.

The food sector's strategic importance to economies such as the EU and Thailand, is further affected by global economic conditions. Thailand as the second biggest economy in ASEAN (Association of Southeast Asian Nations) is a major global tourism destination which is one driver for the demand for imported food and beverages as well as the need for domestic development within the Thai food industry. In 2014, over 24 million tourists visited Thailand, with over 830,000 of these coming from Australia alone [3].

Blessed with an abundance of natural resources, a year-round growing season, relatively low labor costs, and a skilled, well-educated workforce, Thailand possesses great competitive advantages in the food and agricultural arena.

Around 41% of total land area in the country is used for agriculture; as a result, more than 80% of raw materials are sourced from domestic producers at low prices. This economic feature benefits immensely the Thai food processing industry. Plus, the food and agricultural industries account for as much as 28% of the country's gross domestic product and comprise over 116,000 companies (96% of which are SMEs) [1].

Innovation in the food sector is of particular interest, and within the EU, the food sector is the largest manufacturing sector and is one of the main drivers of the EU economy in terms of a high economic output and a major role in employment [4].

In recent years however, the Thai food industry has been subject to a range of changes in society, and has needed to respond to far-reaching technical and economic changes in the production and processing of food. Such changes continue to have significant impacts on the entire processing chain from agricultural production, through food processing to the distribution of food to end consumers [5]. Consequently, innovation is deemed to be one of the most important factors in enhancing competitiveness within the food sector [4].

There are signs that these entrepreneurs in the Thai food industry, especially in seafood and food ingredients, such as fresh chicken and processed meat, can increase or expand the volume and value of exports of food products to countries or groups of countries. With the outlook for economic growth of countries with major economies such as the US, EU and Japan increasing, confidence of Thai entrepreneurs in the food industry has increased.

From the foregoing, the researchers were interested in studying the development of knowledge management and intellectual capital on innovation and how they affect the Thai food industry. A preliminary review of the literature suggests that intellectual capital is a driving force in business innovation and competitive advantage. Knowledge management is also key as a coordinating mechanism which allows the use of resources more efficiently.

The consolidation of the ASEAN Economic Community (AEC) and the reduction of tariffs has increased opportunities but at the same time, increased intense competition. Thai entrepreneurs therefore need to develop products with different features through a process of continuous innovation.

To address the above issues, the following factors are to be evaluated and researched:
1) What are the structural relationships of the variables that affect the Thai food industry Innovation?
2) What factors influence either directly, indirectly, or overall, Intellectual Capital and Knowledge Management on Thai food industry Innovation?
3) To develop a structural equation model of the variables that affect Thai food industry Innovation.

II. CONCEPTUAL DEVELOPMENT

A. Intellectual Capital (IC)

Chen, Zhu, and Xie [6] conducted IC research in China and indicated that IC is classified into human capital, structural capital, innovation capital and customer capital. Furthermore, their conclusions strongly suggested that there is a very strong inter-relationship between the four variables.
Sánchez-Cañizares et al. [7] examined the connection between the concepts of organizational culture and intellectual capital. The model highlighted culture as an essential component of intellectual capital and considered culture as the central nucleus around which the remaining integrated capitals configure. It was stated that the importance of cultural capital is seen within organizations at two levels: the national culture; and the culture of the organization. These are essential features, and give internal logic to the proposed model.
In Germany, research linked the value of intellectual capital and intellectual property to firm performance. Study results showed that including intellectual property in models linking intellectual capital to firm performance enhances the statistical validity of such models and their relevance for management. Additionally, intellectual capital is an important source of an organization's economic wealth and is therefore to be taken into serious consideration when formulating the firm's strategy [8].
Petty and Cuganesan [9] asserted that the term 'intellectual capital' is often treated as being the same as 'intangible assets'. The definition offered by the OECD, however, distinguishes the two by locating intellectual capital as a subset of, rather than the same as, the overall intangible asset base of a firm [10].
Today, a consensus has developed that intellectual capital can be characterized in terms of a tripartite model comprising human capital, external capital and internal capital components [10], [11] where:
1. human capital refers to the skills/competences, training and education, and experience and value characteristics of an organization's workforce;
2. external capital (relational/customer capital) comprises relationships with customers and suppliers, brand names, trademarks, and reputation; and
3. internal capital refers to the knowledge embedded in organizational structures and processes, and includes patents, research and development, technology, and systems.
This is consistent with the research of Tsan and Chang [12] that identified 8 intellectual capital components within the Taiwanese IT industry. It was furthermore discovered that innovation capability plays an important role in confronting the knowledge-based economy in Taiwanese IT industries.
The importance of intellectual capital (IC) in organizations is well accepted [13], with human capital, organizational capital and relational capital positively influencing competitive advantage. Furthermore, human capital has a direct effect on innovation [13].
This is also consistent with the research from Sharabati and Jawad [14] which concluded that organizations can benefit from the management of intellectual capital.
As we can see, scholars have varied opinions as to what comprises 'intellectual capital', but for the proposed study, Human Capital, Structural Capital, and Relational Capital were chosen as the observed variables of Intellectual Capital.

Human Capital

Human capital or assets is the beginning of knowledge, because human beings have the power to innovate and develop processes and equipment that can be more efficient. Organizational performance depends on its use of knowledge which needs to be developed, while storing, and sharing (Knowledge Management), thus promoting the organization's capital [15].
Human resources are also resources that organizations should invest in and develop to realize their full potential. This is accomplished by encouraging and motivating employees and engaging in work efficiency [16].
Not only is private industry spending important in human capital development, but the importance of public spending is as well, which plays a role in promoting economic growth [17]. It has also been stated that spending on R&D over public infrastructure has a greater potential in promoting economic growth

Structural Capital

Structural capital (also referred to as organizational capital) is one of the three primary components of intellectual capital, and consists of the company owned supportive infrastructure, processes, and knowledge management systems of the organisations that enable human capital to function [18]. It is owned by an organization and remains with an organization even when people leave.
Sáenz et al [19] added that organizational design, organizational culture, policies and guidelines, strategy, technological infrastructure (i.e. technological capital) and external alliances are all structural capital components which shape the company's organizational context and which could affect knowledge sharing and innovation.

This is consistent with Deeb and Merhej [20] which indicated the positive and significant relationship between a university's structural capital and innovation performance. This is consistent with Saint-Onge [21] which went on to indicate that the intellectual capital framework represents the primary value-creation dynamics of an organization.

Relational Capital

Relational capital is one of the three primary components of intellectual capital, and is the value inherent in a company's relationships with its customers, vendors, and other important constituencies [22]. Put is simpler ways, "It is not what you know, but who you know" [23].

Relational capital is also referred to as 'external capital' and 'customer capital' [22]. It is the most important component because it is the part of an organization that brings income to the organization and the importance of the enterprise data warehouse. Relational capital is also complemented with concepts of human capital [23].

Other research has shown that among the indicators of relational capital, advertising expenditures have been described as the most often used [24], as have other factors relating to customer satisfaction [25].

B. Knowledge Management

Organizational performance depends on its use of knowledge which needs to be developed, while storing, and sharing (Knowledge Management), thus promoting the organization's capital [15].

Ling [26] studied organizational global performance and determined that a combination of the right type of knowledge management strategy with the right form of intellectual capital will enhance a firm's performance.

This is consistent with Davenport [27] which indicated that in the US knowledge workers comprise between 25% to 50% of the workforce. In Japan, Nonaka and Takeuchi [28] tied Japanese company success to their ability to create new knowledge and use it to produce successful products and technologies. From Nigeria, a literature review indicated that the effective management of knowledge is a critical ingredient for organisations seeking to ensure sustainable strategic competitive advantage [29].

Knowledge Acquisition

Omotayo [29] indicated that the attention and importance given to knowledge acquisition in both the literature as well as practice in past years is of necessity due to changes in the environment, such as increased globalized competition, speed of information and knowledge aging, dynamics of both product and process innovations, and competition through buyer markets [30]. In a knowledge based economy, knowledge acquisition and management is increasingly viewed as critical to organisational effectiveness and performance [31], with the food industry being one of the most knowledge-intensive industries with short product life cycles [32].

Knowledge Creation

Pei indicated that knowledge creation is important in the sense that innovation is driven by the creation of knowledge, and knowledge creation is perceived as one of its major assets [33]. Furthermore, Du Plessis [34] defined innovation as "the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures and to create market driven products and services." Learning is also an essential input for knowledge creation [33].

Shani et al., [35] said that the rapid increase of knowledge within the organization seems to add complexity to the design of new products, with knowledge management being a mechanism to manage the complexity of innovation. Networks are therefore driven by innovation and knowledge management together [36]. In knowledge economies, enterprises need to adapt and update their knowledge to keep their capability of innovation [37].

Knowledge Sharing

Capturing and sharing critical knowledge and expertise should be occurring continuously among employees, with organizational value creation being a function of both possessing valuable intangible assets as well as being able to manage these assets systematically [38].

This is consistent with Kogut and Zander [39] which stated that various studies show that knowledge sharing will contribute to organizational capabilities, such as innovation, which is very important factor in determining the performance of the business.

Research in China also found that both explicit and tacit knowledge sharing practices facilitate innovation and performance. Explicit knowledge sharing has more significant effects on innovation speed and financial performance while tacit knowledge sharing has more significant effects on innovation quality and operational performance [40].

Furthermore, knowledge sharing among employees will enhance rapid response to customer needs at a lower cost in operation [41].

C. Innovation

Innovation has been defined as a multistage process whereby organisations transform ideas into new/improved products/services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace [42]

Salim and Sulaiman [43] discussed the effects of organizational learning on innovation as well as the impact of innovation on company performance on the Malaysian ICT industry. The findings supported evidence that organizational learning contributes to innovation capability, and that innovation is positively related to firm performance. This is consistent with

Vincent et al. [44] that stated that innovation is significantly and positively related to superior performance.

Baregheh et al. [4] used Francis and Bessant's classification of innovations (product, process, position, and paradigm) to study the UK SME food industry and stated that innovation is deemed to be one of the most important factors in enhancing competitiveness within the food sector. This was consistent with statements from Thailand's largest agribusiness CEO that technology and innovation were keys to the company's success at becoming the global top maker of animal feed [45].

Product Innovation

Ju [46] examined critical factors influencing product innovation in the Chinese food industry which subsequently identified three key elements including market research (most critical component for product innovation), strategy (crucial factor), and technology (weak role).

This was consistent with research from Tung [47] which applied the perspective of new product development, brand extension and organizational change to highlight the impact of product innovation on firm performance. The results of the study indicated that when firms decide to allocate resources to product innovation, they expected to gain leverage in terms of competitiveness and performance and concluded that product innovation is significant for a firm's performance and survival.

Process Innovation

Process innovation can be defined as the implementation of a new or significantly improved production or delivery method [48]. The method of creating innovation is to discover, create, and develop ideas, to refine them into useful forms, and to use them to earn profits, increase efficiency, and/or reduce costs.

Furthermore, the term 'innovation' may also be used for changes that are new within the local context but the contribution to global knowledge is minimal. In this larger sense, innovation may be as relevant to the developing part of the world as elsewhere [49].

This is consistent with the research of Hervas-Oliver et al. [50] on 2,412 Spanish organizations on process innovation as a growth strategy for SMEs. The results showed that process innovation strategy is mainly shaped by the acquisition of embodied knowledge, which acts as a key mechanism for countering firms' weak internal capabilities. Results suggested that SMEs conducting a process innovation strategy rely heavily on the acquisition of external sources of knowledge in order to complement their weak internal innovative capabilities, and their pattern of innovation shows clear-cut differences from traditional R&D-based product innovation strategies.

Gunday et al. [51] stated that innovation is broadly seen as an essential component of competitiveness, embedded in the organizational structures, processes, products and services within a firm. Research results revealed the positive effects of innovations on firm performance in manufacturing industries.

Najib and Kiminami [52] researched Indonesian food processing small and medium enterprises (SMEs) in food processing industry clusters and determined that business performance is a function of innovation, in which research results showed that innovation significantly affects the business performance of SMEs.

Technical Innovation

Technical innovations, including products, processes and technologies used to produce goods or services have a direct relationship to the activities of the organization [53] for technical innovation and it is therefore important for companies to achieve and maintain a competitive advantage, resulting in management innovation [54].

From the above literature review and related theory, the researchers created the following three hypotheses:

H1: Intellectual Capital has a direct influence on Knowledge Management.

H2: Intellectual Capital has a direct influence on Innovation.

H3: Knowledge Management has a direct influence on Innovation.

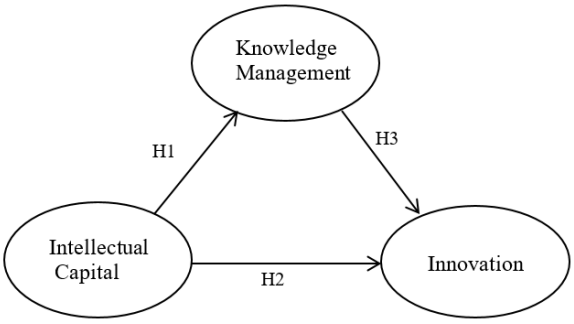


Fig.1. Conceptual Model and Hypotheses

III. METHODOLOGY

D. Questionnaire Design

Questionnaires will be constructed to be a tool to measure concept definition and practice. The instrument or questionnaire will use a 7-point Likert Scale [55] as the measurement scale and the conceptual framework for determining the internal consistency measured by Cronbach's alpha (α-coefficient) which is considered to be a measure of scale reliability [56].

Monitoring of quality and content will be accomplished with tools used in the research and as a measurement of quality with both content validity and reliability being assured by 5 experts in their associated fields with an evaluation index consistent with the content and the purpose of the research. Also, Rovinelli and Hambleton's [57] index of Item-Objective Congruence (IOC) will be employed

to carry out the screening of questions. At the item development stage, the IOC is a procedure used in test development for evaluating content validity. This measure is limited to the assessment of unidimensional items or items that measure specified composites of skills [58].

The method prescribed by Rovinelli and Hambleton [57] results in indices of item congruence in which experts rate the match between an item and several constructs assuming that the item taps only one of the constructs which is unbeknownst to the experts. The research then proceeded to select items that with an IOC index higher than 0.5 which were considered acceptable.

E. Measurement

A quantitative research study starts by identifying and defining the variables of interest, including how to measure them in a reliable and valid manner [59]. Table 1 presents the proposed latent and observed variables thus far identified and their related theory. Additionally, the study will employ a 5-point Likert scale questionnaire as a tool for quantitative research.

Table 1. Latent and observed Variables and theory

Latent Variables	Observed Variables	Supporting Theory
Intellectual Capital	Human Capital	[6]-[14] [15]-[17]
	Structural Capital	[18]-[21]
	Relational Capital	[22]-[26]
Knowledge Management	Knowledge Acquisition	[15], [26]-[29] [29]-[32]
	Knowledge Creation	[33]-[37]
	Knowledge Sharing	[38]-[41]
Innovation	Product Innovation	[4],[42]-[45] [46]-[47]
	Process Innovation	[48]-[52]
	Technical Innovation	[15], [53], [54]

IV. DISCUSSION AND ADOPTION

The results of the research thus far on intellectual capital and knowledge management on the Thai food industry innovation are discussed as follows:

Hsu and Sabherwal [13] found that intellectual capital was the key to sustainable competitive advantage with publicly-listed Taiwanese companies. From Jordan, Sharabati et al. [14] indicated that intellectual capital is a critical force that drives economic growth. It was also stated that social capital is the capacity of a nation to create and develop entrepreneurs, inventors, innovators, and leaders.

From Thailand, Suwannaporn and Speece [60] discovered that marketing research is most critical in the food industry, with internal communication in the new product development process and supplier linkages being predictors of success rates.

Human capital, organizational capital and relational capital positively influence competitive advantage [61], as well as being vital to a sustainable competitive advantage.

CONCLUSION

From the literature review and discovery, 'Determinants of Thai Food Industry Innovation: A Conceptual Perspective, preliminary findings indicate that intellectual capital and knowledge management help in developing the Thai food industry's innovation. To overcome potential competitors and barriers, the Thai food industry must be developed and improved embracing innovative technologies used in the production of goods or services. New products and packaging must be diverse meeting the needs of customers, quickly covering diverse markets with production technologies meeting these needs and capacity of the Thai food industry. Value creation therefore needs to focus on technology and innovation to enhance the value for Thai products, packaging, and production within the Thai food industry.

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